

# MATERIAL SAFETY DATA SHEET

## 1. SUBSTANCE AND SOURCE IDENTIFICATION

National Institute of Standards and Technology  
Standard Reference Materials Program  
100 Bureau Drive, Stop 2320  
Gaithersburg, Maryland 20899-2320

SRM Number: 699  
MSDS Number: 699  
SRM Name: Alumina (Reduction Grade)

Date of Issue: 19 April 2006

MSDS Coordinator: Mario Cellarosi  
Telephone: 301-975-6776  
FAX: 301-926-4751  
E-mail: SRMMSDS@nist.gov

Emergency Telephone ChemTrec:  
1-800-424-9300 (North America)  
+1-703-527-3887 (International)

**Description:** Standard Reference Material (SRM) 699 consists of 60 g alumina powder of which 95 % is less than 74  $\mu\text{m}$  (No. 200).

**Substance:** Alumina (powdered form)

## 2. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS<sup>1</sup>

<b>Component:</b>	Alumina (powdered form)
<b>Other Designations:</b>	Alumina (aluminum oxide; alundum; dialuminum trioxide; alumite; almite; martoxin)
<b>CAS Number:</b>	1344-28-1
<b>EC Number (EINECS):</b>	215-691-6
<b>SRM Nominal Concentration (mass %):</b>	100
<b>EC Classification:</b>	Not determined.

<sup>1</sup> Hazardous components 1 % or greater; Carcinogens 0.1 % or greater are listed in compliance with OSHA 29 CFR 1910.1200. For the list and actual concentration of other constituents less than 1 %, which are below the reportable limit, refer to the corresponding Certificate of Analysis.

## 3. HAZARDS IDENTIFICATION

**NFPA Ratings (Scale 0–4):** Health = 1      Fire = 0      Reactivity = 0

**Major Health Hazards:** No significant target effects reported.

### Potential Health Effects

**Inhalation:** Inhalation of high concentrations of alumina may cause coughing, shortness of breath, respiratory tract irritation due to mechanical action, unpleasant deposits in the nasal passages, and exacerbation of symptoms in persons with impaired pulmonary function.

**Skin Contact:** Skin contact may cause irritant dermatitis due to mechanical action.

**Eye Contact:** Eye contact may cause irritation with redness and possible swelling of the conjunctiva due to mechanical action.

**Ingestion:** Ingestion may cause constipation.

**Listed as a Carcinogen/  
Potential Carcinogen:**

Alumina

Yes	No
-----	----

_____	<u>X</u>
-------	----------

In the National Toxicology Program (NTP) Report on Carcinogens.

_____	<u>X</u>
-------	----------

In the International Agency for Research on Cancer (IARC) Monographs.

_____	<u>X</u>
-------	----------

By the Occupational Safety and Health Administration (OSHA).

---

#### 4. FIRST AID MEASURES

---

<b>Inhalation:</b>	If adverse effects occur, remove to uncontaminated area. Give artificial respiration, if not breathing, by qualified personnel. Get immediate medical attention.
<b>Skin Contact:</b>	Rinse affected area with copious amounts of water for at least 15 minutes while removing contaminated clothing. Get medical attention, if needed.
<b>Eye Contact:</b>	Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Get immediate medical attention.
<b>Ingestion:</b>	Get immediate medical attention.

---

#### 5. FIRE FIGHTING MEASURES

---

<b>Fire and Explosion Hazards:</b>	Alumina is a negligible fire hazard.
<b>Extinguishing Media:</b>	Use extinguishing agents appropriate for the surrounding fire.
<b>Fire Fighting:</b>	Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).
<b>Flash Point:</b>	Not applicable.
<b>Method Used:</b>	Not applicable.
<b>Autoignition Temp.:</b>	Not applicable.
<b>Flammability Limits in Air</b>	
<b>UPPER (Volume %):</b>	Not applicable.
<b>LOWER (Volume %):</b>	Not applicable.

---

#### 6. ACCIDENTAL RELEASE MEASURES

---

<b>Occupational Release:</b>	Collect spilled material in appropriate container for disposal. Avoid generating dust. Clean up residue with a high-efficiency particulate filter vacuum.
<b>Disposal:</b>	Refer to Section 13, "Disposal Considerations".

---

#### 7. HANDLING AND STORAGE

---

<b>Storage:</b>	Store and handle in accordance with all current regulations and standards. Store in a tightly closed container. Keep separated from incompatible substances.
<b>Safe Handling Precautions:</b>	See Section 8, "Exposure Controls and Personal Protection".

---

#### 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

---

<b>Exposure Limits:</b>	<b>Alumina</b> OSHA (PEL): 5 mg/m <sup>3</sup> TWA (respirable dust fraction) OSHA (PEL): 15 mg/m <sup>3</sup> TWA (total dust) ACGIH: 10 mg/m <sup>3</sup> TWA UK WEL: 10 mg/m <sup>3</sup> TWA (total inhalable dust) UK WEL: 4 mg/m <sup>3</sup> TWA (respirable dust)
<b>Respirator:</b>	This material in this SRM is less than the inhalation average particulate size established by the ACGIH (average particulate sizes less than 100 µm), and therefore requires proper inhalation/respiratory protection. Please refer to OSHA Respiratory Protections Standards 29 CFR Part 1910.134 for proper protection and the "NIOSH Guide to the Selection and Use of Particulate Respirators Certified under 42 CFR 84" for selection and use of respirators certified by NIOSH.
<b>Eye Protection:</b>	Wear safety goggles. An eye wash station should be readily available near areas of use.
<b>Personal Protection:</b>	Wear appropriate protective clothing and chemically resistant gloves to prevent skin exposure.

---

## 9. PHYSICAL AND CHEMICAL PROPERTIES

---

<b>Component:</b>	<b>Alumina</b>
<b>Appearance and Odor:</b>	Solid. Powder. White to gray. Odorless.
<b>Relative Molecular Mass:</b>	101.96
<b>Molecular Formula:</b>	Al <sub>2</sub> O <sub>3</sub>
<b>Melting Point:</b>	2053 °C to 2072 °C
<b>Density:</b>	3.965 g/cm <sup>3</sup>
<b>Water Solubility:</b>	Insoluble.
<b>Solvent Solubility:</b>	Soluble in mineral acids and strong alkali. Practically insoluble in nonpolar organic solvents.

---

## 10. STABILITY AND REACTIVITY

---

<b>Stability:</b>	<u>  X  </u> Stable <u>      </u> Unstable
	Stable at normal temperatures and pressure.
<b>Conditions to Avoid:</b>	Avoid conditions which promote generating dust.
<b>Incompatible Materials:</b>	Halo carbons. Halogens. Combustible materials. Oxidizing materials.
<b>Fire/Explosion Information:</b>	See Section 5, "Fire Fighting Measures".
<b>Hazardous Decomposition:</b>	Thermal decomposition can produce miscellaneous products.
<b>Hazardous Polymerization:</b>	<u>      </u> Will Occur <u>  X  </u> Will Not Occur

---

## 11. TOXICOLOGICAL INFORMATION

---

<b>Route of Entry:</b>	<u>  X  </u> Inhalation <u>  X  </u> Skin <u>  X  </u> Ingestion
<b>Toxicity Data:</b>	<b>Alumina</b> Rat, Intermittent-Inhalation TC <sub>LO</sub> : 200 mg/m <sup>3</sup> (5 h–28 weeks)
<b>Tumorigenic, Reproductive, Mutagenic Data:</b>	Alumina has been investigated as a tumorigenic effector.
<b>Health Effects (Acute and Chronic):</b>	See Section 3, "Hazards Identification" for potential health effects.

---

## 12. ECOLOGICAL INFORMATION

---

<b>Ecotoxicity Data:</b>	Not available.
--------------------------	----------------

---

## 13. DISPOSAL CONSIDERATIONS

---

<b>Waste Disposal:</b>	Dispose in accordance with all applicable federal, state, and local regulations.
------------------------	--

---

## 14. TRANSPORTATION INFORMATION

---

<b>U.S. DOT and IATA:</b>	Not regulated by DOT and IATA.
---------------------------	--------------------------------

---

## 15. REGULATORY INFORMATION

---

<b>U.S. Regulations:</b>	CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated. SARA Title III Section 302 (40 CFR 355.30): Not regulated. SARA Title III Section 304 (40 CFR 355.40): Not regulated. SARA Title III Section 313 (40 CFR 372.65): Not regulated. OSHA Process Safety (29 CFR 1910.119): Not regulated.
--------------------------	--

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE:	No.
CHRONIC:	Yes.
FIRE:	No.
REACTIVE:	No.
SUDDEN RELEASE:	No.

**State Regulations:** California Proposition 65: Not regulated.

**CANADIAN Regulations**

**WHMIS Classification:** Not determined.

**EUROPEAN Regulations**

**EC Classification (assigned):** Not determined.

**National Inventory Status**

**U.S. Inventory (TSCA):** Listed on inventory.

**TSCA 12(b)**

**Export Notification:** Not listed.

---

## 16. OTHER INFORMATION

---

**Sources:** MDL Information Systems, Inc., MSDS *Aluminum Oxide*, 16 June 2005.

**Disclaimer:** Physical and chemical data contained in this MSDS are provided only for use as a guide in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data in the MSDS. The certified values for this material are given in the NIST Certificate of Analysis.